CLAIMS

What is claimed is:

1. An apparatus for earth working and ground leveling, comprising:

a trailer having a hitching assembly;

a grader secured to the trailer;

the trailer further including a carriage frame secured to the grader, the carriage frame including a wheel support assembly having a lateral directed axis, laterally spaced wheels supported on the wheel support and spaced therefrom for providing ground support for the apparatus, the wheel support assembly further comprising a first actuator having a length for producing a first actuating movement for pivoting the wheels about the axis in response to movement of the first actuator, so that pivoting movement of the wheels raises and lowers the wheels relative to the grader;

a second actuator having a length for producing a second actuating movement; and

a mechanism connecting the first actuator and second actuator.

2. The apparatus of claim 1, wherein:

the second actuator having an adjustable length with an end secured to a trailer arm and an opposite end secured to the mechanism; and

the pivoting movement of the wheels about the axis in a first direction occurring in response to lengthening the first actuator, and pivoting movement of the wheels about the axis in a second direction occurring in response to shortening the first actuator.

3. The apparatus of claim 1, wherein:

the second actuator comprises a turnbuckle having a first attachment secured to the hitching assembly and a second end attachment secured to the mechanism, a rotatable sleeve engaged with the first end attachment and second end attachment.

4. The apparatus of claim 1, wherein:

the first actuator comprises a hydraulic cylinder having a first cylinder end secured to the carriage frame and a second cylinder end secured to the axis, pivoting movement of the wheels about the axis in a first direction occurring in response to lengthening the first actuator, and pivoting movement of the wheels about the axis in the second direction occurring in response to shortening the first actuator.

5. The apparatus of claim 1, wherein:

the wheel support assembly comprises a wheel support plate pivotally secured for movement about the axis, the first actuator secured to the wheel support plate for transmitting movement of the first actuator about the axis in response to the actuator thereby pivoting the wheels; and

the mechanism includes a post supported on the grader and a pivot plate pivotally supported on the post and secured to the second actuator, and a linkage connecting the pivot plate and the wheel support plate.

6. The apparatus of claim 1, wherein:

the first actuator having an end secured to a fixed cross member of the carriage frame and an opposite end secured to the wheel support assembly, for producing a force tending to oppose pivoting movement of the wheel support assembly about the axis.

7. The apparatus of claim 1, wherein the wheel support assembly further comprises:

laterally spaced arms supporting the wheels;

a journal; and

a jack shaft secured to the arms, aligned with the axis, and supported on the journal at a position spaced from the wheels, for pivoting movement about the axis.

8. The apparatus of claim 1, wherein the wheel support assembly further comprises:

laterally spaced arms supporting the wheels;

a journal;

a jack shaft secured to the arms, aligned with the axis, and pivotably supported on the journal at a position spaced from the wheels; and

a wheel support plate driveably connected to the first actuator and secured to the jack shaft for angular movement therewith about the axis in response to the first actuator.

9. The apparatus of claim 1, wherein the grader comprises:

at least two side rails, each side rail supporting an adjustment plate having angularly spaced attachments;

a cutting blade located at the front of the grader, attached to a lower surface of the side rails, the cutting blade having a V-shaped nose and a length extending laterally and rearward from the nose; and

at least two rear blades located behind the cutting blade, each rear blade supported on a hinge for attachment to a corresponding adjustment plate at an adjustable angular position about the hinge.

10. The apparatus of claim 1, further comprising:

an implement frame having a lateral rail for supporting and releasably securing an implement to the rail, the implement frame being supported on the carriage frame alternately in a first position where the lateral rail is raised from the ground, and in a second position where the lateral rail is pivoted on the carriage frame toward the ground from the first position.

11. An apparatus for earth working and ground leveling, comprising:

a grader to which earth working and ground leveling implements can be secured, the grader having first and second laterally spaced side rails;

a trailer secured to the grader and connectable to a vehicle by a trailer arm, the trailer further including;

a carriage frame having third and fourth laterally spaced side rails secured to the first and second side rails of the grader, laterally spaced wheels, a wheel support assembly having a journal with a lateral directed axis, the wheel support assembly further including laterally spaced arms supporting the wheels and a jack shaft secured to the arms, the jack shaft being supported pivotably on the journal at a position spaced from the wheels; and

a first actuator including a first end secured against displacement and a second end driveably connected to the jack shaft eccentric of the axis.

12. The apparatus of claim 11, wherein the grader includes:

a cutting blade having a V-shaped nose, the blade extending laterally and rearward from the nose and having a lower edge located substantially in a plane.

13. The apparatus of claim 11, wherein the grader includes:

a cutting blade located at the front of the grader, attached to a lower surface of the side rails and having a V-shaped nose and a length extending laterally and rearward from the nose.

14. The apparatus of claim 11, wherein the first actuator has an adjustable length for pivoting the wheels about the axis in response to an adjustment of said length.

15. The apparatus of claim 11, further comprising:

an attachment plate connecting the first actuator and the jack shaft, for pivoting the wheels about the journal axis in response to movement of the first actuator, the pivoting movement of the wheels about the journal axis raising and lowering the wheels relative to the grader.

16. The apparatus of claim 15, further comprising:

a post supported on the grader;

a pivot plate pivotably supported on the post and secured to a second actuator; and

a linkage connecting the pivot plate and the attachment plate.

17. The apparatus of claim 15, wherein:

the first actuator having an end secured to a fixed cross member of the carriage frame and an opposite end secured to the jack shaft, for producing a force tending to oppose pivoting movement of the wheel support assembly about its journal axis.

18. The apparatus of claim 16, wherein:

the second actuator comprises a turnbuckle having a first end attachment secured to the trailer arm and a second end attachment secured to the pivot plate, a rotatable sleeve engaged with the first end attachment and second end attachment.

19. An earth working apparatus that attaches to a vehicle, the apparatus comprising:

a grader to which earth working implements can be secured, the grader including first and second laterally spaced side rails;

a trailer secured to the grader, the trailer including;

a hitching assembly;

a carriage frame secured to the first and second side rails of the grader, the carriage frame having laterally spaced wheels, a journal secured to the carriage frame having a lateral directed axis, laterally spaced arms supporting the wheels, a jack shaft secured to the arms and supported pivotably on the journal at a position spaced from the wheels;

a wheel support actuator including a first end secured against displacement, and a second end driveably connected to the jack shaft eccentric of the laterally directed journal axis;

a post supported on the grader;

a first pivot plate pivotably supported on the post and secured to a pivot attachment actuator;

a second pivot plate secured to the jack shaft; and

a linkage connecting the first pivot plate and the second pivot plate.

20. The apparatus of claim 19, wherein the grader includes:

a cutting blade having a V-shaped nose, the cutting blade extending laterally and rearward from the nose of the cutting blade, and the cutting blade including a lower edge located substantially in a plane.

21. The apparatus of claim 19, wherein:

the pivot attachment actuator comprises a turnbuckle having a first end secured to the hitching assembly of the trailer and a second end secured to the first pivot plate, angular movement of a cutting blade relative to a horizontal occurring in response to lengthening the pivot attachment actuator.

22. The apparatus of claim 19, wherein:

the wheel support actuator having one end secured to a fixed cross member of the carriage frame and an opposite end connected to the jack shaft for producing a force tending to oppose pivoting movement about the journal axis.

23. The apparatus of claim 19, further comprising:

an implement frame supported on the carriage frame away from ground contact and for pivotable movement toward the ground.